

REMARKS

This Amendment is in response to the Final Office Action dated March 4, 2005 and is requested to be entered in connection with filing an RCE concurrently herewith. In the Office Action, the Examiner rejected claims 1-41 under 35 U.S.C. § 103(a) as being unpatentable over Stevens, U.S. Patent No. 6,633,976 (hereinafter *Stevens*), in view of Patel, U.S. Patent No. 5,999,989 (hereinafter *Patel*). Claim 25 was also objected to for informalities.

Claims 1-3, 5, 6, 15, 16, 25, 26, and 34 are amended as shown above. Specifically, independent claims 1, 15, 25, 34 are amended to more clearly recite features of the claimed invention. Notably, the Applicants disagree with the final rejection of claim 1-41 in their previous form, and have amended the foregoing claims to reduce the length of prosecution rather than because the previous version of the claims were not patentable. Claim 25 has also been amended, in part, to correct the informalities identified by the Office Action. Thus, claims 1-41 are now pending in the application. For the reasons set forth below, the Applicants respectfully request reconsideration and allowance of all pending claims.

Argument in Support of Allowance of Amended Claims

Claim Rejections - 35 U.S.C. § 103

To establish a *prima facie* case of obviousness, there must first be some suggestion or motivation to modify a reference or to combine references, and second be a reasonable expectation of success. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. Third, the prior art reference (or references when combined) must teach or suggest all the claim limitations. M.P.E.P. § 706.02(j) from *In Re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). Where claimed subject matter has been rejected as obvious in view of a combination of prior art references, a proper analysis under § 103 requires, *inter alia*, consideration of two

factors: (1) whether the prior art would have suggested to those of ordinary skill in the art that they should make the claimed device; and (2) whether the prior art would also have revealed that in so making, those of ordinary skill would have a reasonable expectation of success. Both the suggestion and the reasonable expectation of success must be founded in the prior art, not in the Applicants' disclosure. *Amgen v. Chugai Pharmaceutical*, 927 F.2d 1200, 18 USPQ2d 1016 (Fed. Cir. 1991), *Fritsch v. Lin*, 21 USPQ2d 1731 (Bd. Pat. App. & Int'f 1991). An invention is non-obvious if the references fail not only to expressly disclose the claimed invention as a whole, but also to suggest to one of ordinary skill in the art modifications needed to meet all the claim limitations. *Litton Industrial Products, Inc. v. Solid State Systems Corp.*, 755 F.2d 158, 164, 225 USPQ 34, 38 (Fed. Cir. 1985).

The examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references. M.P.E.P. § 70602(j) from *Ex parte Clapp*, 227 USPQ 972, 973 (Bd. Pat. App. & Inter. 1985). Obviousness cannot be established by combining references without also providing evidence of the motivating force which would impel one skilled in the art to do what the patent applicant has done. M.P.E.P. § 2144 from *Ex parte Levengood*, 28 USPQ2d 1300, 1302 (Bd. Pat. App. & Inter. 1993) (emphasis added by M.P.E.P.).

Claim 1, as amended, now recites,

1. A method comprising:

starting execution of a basic input output system (BIOS), the BIOS including a plurality of firmware modules;

determining **firmware resources** required by each of **the plurality of firmware modules** to operate, the firmware resources required, if any, for a given firmware module provided by **one or more other firmware modules**;

scheduling modules of the plurality of firmware modules for execution in consideration of the required firmware resources that are determined; and

dispatching the scheduled modules for execution. (Emphasis Added)

In support of the rejection of claim 1 in its previous form as unpatentable of *Stevens* in view of *Patel*, the examiner asserts the *Stevens* discloses all of the claim elements except for the element of determining resources required by the plurality of (firmware) modules. In view of this deficiency, the Examiner asserts that this element is disclosed by *Patel*, stating,

Patel disclosed a method comprising: Determining resources required by a plurality of modules [devices] to operate [col.3, 11.58-61; col.4, 11.31-44; col. 5, 11.20-32, 11.58-60; memory devices can contain firmware; IPL devices as firmwares].

Scheduling modules of the plurality of firmware modules for execution in consideration of the required resource that are determined [col. 5, 11.20-48; IPL firmwares are scheduled ahead of other firmwares due to specific resources].

Claim 1 has been amended to make it clear that the plurality of modules for which a determination is made to what resources are required are firmware modules, and that the resources that are required are firmware resources provided by other firmware modules. The resource requirements referred to in *Patel* clearly concern hardware devices, and clearly *Patel* does not teach or fairly suggest the elements of determining **firmware resources** required by **the plurality of firmware modules** to operate.

Column 3, lines 58-61 of *Patel* states,

Devices that exchange data with the microprocessor typically are assigned IO space allocations that may or may not be shared with other devices. **Devices include memories, as well as peripheral and other devices...**(Emphasis added)

Column 4, lines 31-44 states,

Although different BIOS designs perform essentially the same steps in slightly different order, the BIOS must at some point *read registers within the devices* themselves to determine what devices exist on the system, and what the **resource requirements are for those devices**.

Only after reading *these registers* can the BIOS determine an appropriate allocation of system resources to configure a maximum number of devices. Also, the BIOS can determine from the information obtained from device registers what drivers to load into memory, to allow the microprocessor to access the device. The driver may be in the ROM as well, particularly if the driver is nonstandard; if multiple devices use the same driver, however, the BIOS may load all into memory when the system is initialized. (Emphasis added)

Column 5, lines 20-48 states,

As part of the initialization, the POST then tries to turn all of the devices off, to determine which *devices* might be useful in finding and launching the operating system. Typically, devices might be useful in finding and launching the operating system cannot be deactivated by software; they are activated so long as power is applied to the system. Also, such *devices cannot be reallocated, since they need specific, dedicated resources*. By attempting to turn off the *devices*, only those that are useful for booting the operating system remain activated. These *devices ("initial program load" [IPL] devices)* include the system ROM, and generally include a keyboard controller and a video adapter as well. All other devices are deactivated.

Because the purpose of the BIOS is to prepare the system for the booting of an operating system, devices are segregated into two groups: one group, the IPL devices, are determined to be needed for booting the operating system. *The IPL devices typically cannot be deactivated, and typically require highly specific resources*. As such the IPL devices cannot be configured by software. The other group of devices, which can be configured or deactivated by the software, are typically initiated and configured by the BIOS only when it is determined that an operating system other than Plug-and-Play compatible is to be booted. This is because Plug-and-Play compatible operating systems typically can perform their own hardware configurations; performing an initial configuration in the BIOS would be pointless since the operating system would reconfigure the system anyway. (Emphasis added)

Furthermore, Col 6, lines 10-13 states,

The system BIOS is designed to have access to system resource information, and therefore "knows" what system resources are available. The devices are isolated and are read to determine the *resource requirements of the devices*. (Emphasis added)

while Col. 10, lines 59-65 states,

Once all the cards have been isolated, the configuration software (the E/ISA bus enumerator program in Windows 95) wakes up each card (transitioning the card from the sleep state to the configuration state),

reads its configuration registers, and then returns the card to the sleep state. ***In this way, the configuration software builds a comprehensive table of all resource requirements in the system.*** (Emphasis added)

It is clear that the resource requirements referred to in *Patel* relate to resource requirements for hardware devices, and does not concern resource requirements of firmware modules. Furthermore, a firmware module **is not a device**. As is understood by one skilled in the BIOS/Firmware art and as stated in the Background Information section of the present application,

The BIOS (also referred to herein as firmware) in a pre-memory execution environment is usually tightly bound object code that is built for a specific configuration or system design (also referred to herein as a platform). That is, different platforms typically have different BIOSs. More particularly, ***the BIOS typically includes code (also referred to herein as firmware modules)*** for providing certain functions or services, which in turn may depend on the platform.

A firmware module comprises a set of coded instructions (*i.e.*, firmware instructions). A firmware module is analogous to a software module, but is called a firmware module because it is included as part of the platform firmware (coded instructions) that are executed to prepare the platform for booting an operating system (*i.e.*, software).

Additionally, the resources that are determined to be required for a given firmware module are resources provided by other firmware modules. This is clearly not the case for the resources required by the IPL devices or any other devices under *Patel*.

In view of the foregoing, it is clear that the combination of *Patel* and *Stevens* do not teach or fairly suggest all of the claim elements of amended claim 1, and thus at least the third prong of the from *In Re Vaack* test is not met. Accordingly, amended claim 1 is clearly patentable over the cited references.

With respect to independent claim 15, this amended claim is a Beauregard claim reciting software embodied on a machine-readable medium for performing operations analogous to those recited in amended claim 1. Accordingly Claim 15 has clearly

patentable over the cited references for reasons similar to those presented above in support of the patentability of claim 1.

Independent claim 25 is a system claim that has been amended to now recite,

25. A system, comprising:

a plurality of hardware components;

a first memory device to store a BIOS, the BIOS including a plurality of firmware modules, the BIOS further including,

means for determining *firmware resources* required by each of the plurality of *firmware modules* to operate, *the firmware resources required, if any, for a given firmware module provided by one or more other firmware modules*;

means for scheduling execution of modules of the plurality of firmware modules;

means for dispatching scheduled modules for execution; and

a processor on which the firmware modules are executed, coupled to the plurality of hardware components and the first memory device. (Emphasis added)

The previous version of claim 25 was rejected by the Examiner based on “each and every limitation of the claim is disclosed as discussed in reference to claim 1.”

Applicants respectfully assert that the element of “means for determining *firmware resources* required by each of the plurality of *firmware modules* to operate, *the firmware resources required, if any, for a given firmware module provided by one or more other firmware modules*” is clearly not disclosed, taught, or fairly suggested by either the *Patel* reference or the *Stevens* reference. As discussed above, use of determining resource requirements in *Patel* relates to hardware devices, not the resource requirements of firmware modules. While *Stevens* employs BIOS modules, there is no consideration of what firmware resources are required for those BIOS modules. Accordingly, amended claim 25 is clearly patentable of the cited references.

Claim 34 is a system claim that has been amended to now recite,

34. (Currently Amended) A system, comprising:

a plurality of hardware components;

a first memory device to store a BIOS, the BIOS comprising:

a plurality of firmware modules, each module of the plurality of firmware modules to provide at least one service, at least two modules providing an inter-module interface to enable each of said at least two modules to call a service provided by another module;

a core operatively coupled to the plurality of firmware modules, wherein the core, upon operation, selects for execution a set of modules from the plurality of firmware modules ***to be executed in a pre-memory execution environment prior to the initialization and availability of system memory***;

a processor coupled to the plurality of hardware components and the first memory device. (Emphasis added)

Claim 34 has been amended to now include the limitation that the firmware modules are ***to be executed in a pre-memory execution environment prior to the initialization and availability of system memory***, which is substantially analogous to the language recited in amended dependent claim 2, as well.

As stated previously, Applicants agree that *Stevens* discloses the use of a dispatch manager module that calls another module. However, this is clearly not done in a pre-memory execution environment prior to the initialization and availability of system memory. As shown in Fig. 6 of *Stevens*, in response to power on of a computer in step 54, the minimal initialization code 16 of the system BIOS is executed at step 55. as stated in column 5, lines 37-44,

In operation, when the computer 10a is turned on, the initialization code 16 is run to initialize the CPU 11 ***and the system memory 13***. The dispatch manager 17 is then ***loaded into the system memory 13***. The dispatch manager 17 executes the list of tasks contained therein to cause all required BIOS modules to be ***loaded into the system memory 13*** and must be executed.

It is clear that the dispatch operations are performed after system memory has been initialized and is thus available under *Stevens*. Accordingly, *Stevens* does not teach the element of executing the firmware modules in a pre-memory execution environment prior to the initialization and availability of system memory. Furthermore, such an element is not suggested by either the *Stevens* or *Patel* reference, nor would one of ordinary skill in the art be motivated to do so. The availability of system memory makes the dispatch operations much simpler than without system memory, since various data may simply be stored in any manner in the system memory, separate data structures may be used to store temporal data relating to the dispatch, *etc.*

Conclusion

Overall, none of the references singly or in any motivated combination disclose, teach, or suggest what is recited in the independent claims. Thus, given the above amendments and accompanying remarks, independent claims 1, 15, 25, and 34 are now in condition for allowance. The dependent claims that depend directly or indirectly on these independent claims are likewise allowable based on at least the same reasons and based on the recitations contained in each dependent claim.

If the undersigned attorney has overlooked a teaching in any of the cited references that is relevant to the allowability of the claims, the Examiner is requested to specifically point out where such teaching may be found. Further, if there are any informalities or questions that can be addressed via telephone, the Examiner is encouraged to contact the undersigned attorney at (206) 292-8600.

Charge Deposit Account

Please charge our Deposit Account No. 02-2666 for any additional fee(s) that may be due in this matter, and please credit the same deposit account for any overpayment.

Respectfully submitted,

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